

REMARKS

Summary of the Office Action

Claims 156-291, 394-399, 409-424, 448-455, 457-460, 462-464, 466-468, 470-485, and 523-530 were pending in the application.

Claims 156, 157, 160, 161, 164, 165, 167, 169, 172-175, 177, 220, 222-225, 229-234, 236-241, 245-252, 268, 271, 274, 286, 289, 394, 395, 397-399, 409-412, 419-424, 451, 474, 479, and 484 were rejected under 35 U.S.C. § 102(b) as being anticipated by Findler et al. U.S. Patent 5,071,510 ("Findler"). Claims 158, 159, 162, 163, 170, 171, 227, 228, 243, 244, 254, 255, 267, 269, 272, 275, 287, 290, 452, 457, 475, 480, and 485 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Hori et al. U.S. Patent 5,188,706 ("Hori"). Claims 166, 168, 176, 178, 186, 188, 221, 226, 235, 242, 253, 298, 300, 336, 338, 345, 352, and 366 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Shimizu et al. U.S. Patent 4,618,397 ("Shimizu"). Claims 179, 182-185, 187, 189, 192-194, 196, 207-214, 256-261, 265, 266, 277, 280 396, 413-416, 448, 453, 458, 462, 466, 471, 476, and 481 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Stein U.S. Patent 4,070,230 ("Stein"). Claims 180, 181, 190, 191, 278, 281, and 284 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Stein as applied to claims 179 and 189, and further in view of Hori. Claims 186, 188, 195, and 197 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Stein and Shimizu. Claims 198, 201-203, 205, 283, 417, 418, and 470 were rejected under 35 U.S.C. § 103(a) as being obvious

from Findler in view of Bergmans et al. U.S. Patent 4,835,765 ("Bergmans"). Claims 199 and 200 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Bergmans and Hori. Claims 204 and 206 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Bergmans and Shimizu. Claims 215, 216, 262-264, 270, 273, 276, 288, 291, 523, 524, and 528-530 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler, Hori, and Shimizu. Claims 217, 218, 279, 282, 525, and 526 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Stein, Hori, and Shimizu. Claims 219, 285, and 527 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Bergmans, Stein, Hori, and Shimizu. Claims 449, 450, 454, 455, 472, 473, 477, 478, 482, and 483 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Rubinstein et al. U.S. Patent 5,227,959 (hereinafter referred to as "Rubinstein"). Claims 459, 460, 463, and 464 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Stein and Rubinstein. Claims 467 and 468 were rejected under 35 U.S.C. § 103(a) as being obvious from Findler in view of Bergmans and Rubinstein.

Summary of Applicant's Reply

Applicant has amended independent claims 156 and 220 to incorporate the features of claims 157 and 229, respectively, and has accordingly cancelled claims 157 and 229 without prejudice. Applicant has amended independent claims 156, 169, 179, 189, 198, 220, 234, and 245 to incorporate a feature common to each of claims 158, 170, 180, 190, 199, 215-220, 229, 243, 254, 262-264, 267, 269, 270-273, 275, 276,

278, 279, 281, 282, 284, 285, 287, 288, 290, 291, and 523-530, and accordingly has removed that feature from each of these dependent claims as it is present in their respective independent claim. Additionally, applicant has amended claims 158, 160, 215, 262, 267-269, 270-273, 409, 448, 451, 452, 471, 474, 475, 523, 528, and 530 to correct their dependencies and minor clerical errors. No new matter has been added and the amendments and new claims are fully supported by the originally-filed specification.

Summary of Telephonic Interview

Applicant would like to thank the Examiner for the courtesies extended during the July 25, 2007 interview with the undersigned and Mr. Matthew Bertenthal. During the interview, applicant proposed amending the independent claims with features present in the dependent claims to overcome the outstanding rejections over the prior art of record. The Examiner acknowledged that these proposed amendments to the independent claims would be allowable over the prior art of record. Applicant agreed to amend the claims to incorporate the discussed features into each of the independent claims.

Reply to the Prior Art Rejection

The Examiner rejected claims 156, 157, 160, 161, 164, 165, 167, 169, 172-175, 177, 220, 222-225, 229-234, 236-241, 245-252, 268, 271, 274, 286, 289, 394, 395, 397-399, 409-412, 419-424, 451, 474, 479, and 484 under 35 U.S.C. § 102(b) as allegedly being anticipated by Findler. The Examiner rejected claims 158, 159, 162, 163, 166, 168, 170, 171, 176, 178-219, 221, 226-228, 235, 242-244, 253-267, 269, 270, 272, 273,

275-285, 287, 288, 290, 291, 396, 413-418, 448-450, 452-455, 457-460, 462-464, 466-468, 470-473, 475-478, 480-483, 485, and 523-530 under 35 U.S.C. § 103 as being obvious from Findler in view of various combinations of Hori, Shimizu, Stein, Bergmans, and/or Rubenstein.¹

Applicant's claimed invention, as defined by amended independent claims 156, 169, 179, 189, 198, 220, 234, and 245 is directed to, inter alia, methods of making and using integrated circuits that include one or more stress-controlled dielectric layers that are caused to have a stress of about 8×10^8 dynes/cm² or less.

Findler discusses forming a micromechanical component with an epitaxy layer 2 (see, e.g., column 5, lines 15-20 and 64-68), and "an intermediate layer 6 of Si₃N₄" (column 5, lines 29 and 30) over an aluminum layer, wherein the intermediate layer of Si₃N₄ is used as part of the passivation of the aluminum layer 5 in combination with an "organic negative photo film 7" (column 5, lines 30 and 31). The intermediate layer 6 of Findler is used as part of the passivation of an aluminum layer to protect its top surface while a portion of the bottom surface is electro-chemically thinned.

¹Claims 156, 169, 179, 189, 198, 220, 234, and 245 have been amended to incorporate a feature common to each of claims 158, 170, 180, 190, 199, 215-220, 229, 243, 254, 262-264, 267, 269, 270-273, 275, 276, 278, 279, 281, 282, 284, 285, 287, 288, 290, 291, and 523-530. In addressing the rejection of claims 156, 169, 179, 189, 198, 220, 234, and 245, applicant will address the Examiner's rejection with respect to claims 158, 170, 180, 190, 199, 215-220, 229, 243, 254, 262-264, 267, 269, 270-273, 275, 276, 278, 279, 281, 282, 284, 285, 287, 288, 290, 291, and 523-530.

Hori discusses a method of making an X-ray exposure mask, a device for controlling the internal stress of thin films, and the improvement of X-ray absorption of thin film patterns. In particular, Hori discusses forming a tungsten film in the X-ray exposure mask to act as an X-ray absorber.

The Examiner acknowledges that Findler does not show or suggest applicant's claimed feature of forming stress-controlled dielectric layers that are caused to have a stress of about 8×10^8 dynes/cm² or less as defined by independent claims 156, 169, 179, 189, 198, 220, 234, and 245 and cites Hori as allegedly making up for this deficiency. In particular, the Examiner alleges that "Hori ... disclose[s] the stress of the stress-controlled dielectric layer is less than about 8×10^8 dynes/cm² (col. 8, lines 32-59)" (see Office Action, page 4). Applicant respectfully disagrees.

Applicant respectfully submits that Hori does not show or suggest forming stress-controlled dielectric layers that are caused to have a stress of about 8×10^8 dynes/cm² or less, as defined by independent claims 156, 169, 179, 189, 198, 220, 234, and 245. Instead, Hori discusses the stress of a tungsten (W) film that acts as an X-ray absorber in the X-ray exposure mask (see, e.g., col. 8, line 67 through col. 9, line 3). Contrary to the Examiner's assertions, tungsten is a conductive metal that is typically used as an interconnect material in integrated circuits. Regardless of whether neon (Ne), silicon (Si), krypton (Kr), or xenon (Xe) are ion-implanted into the W film to reduce its stress, Hori's W film is in no way, shape, or form a dielectric layer. Thus, Hori does not show or suggest this feature common to all of applicant's independent claims, and cannot make up for the

deficiencies of Findler in that regard. None of Shimizu, Stein, Bergmans, and Rubenstein makes up for the deficiencies of Findler or Horí relative to the rejection.

Accordingly, independent claims 156, 169, 179, 189, 198, 220, 234, and 245, as well as claims 158-168, 170-178, 180-188, 190-197, 199-219, 221-228, 230-233, 235-244, 246-291, 394-399, 409-424, 448-455, 457-460, 462-464, 466-468, 470-485, and 523-530, which depend directly or indirectly from claim 156, 169, 179, 189, 198, 220, 234, or 245, are patentable over the prior art of record.

Conclusion

For the reasons stated above, applicant respectfully submits that this application, as amended, is in condition for allowance. Reconsideration and prompt allowance of this application are accordingly respectfully requested.

Respectfully submitted,

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